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AN ESSAY

ON THE

ACTION AND CURATIVE PROPERTIES

OF

STRYCHNIA,

TO WHICH THE

ANNUAL MEDAL OF THE HARVEIAN MEDICAL SOCIETY

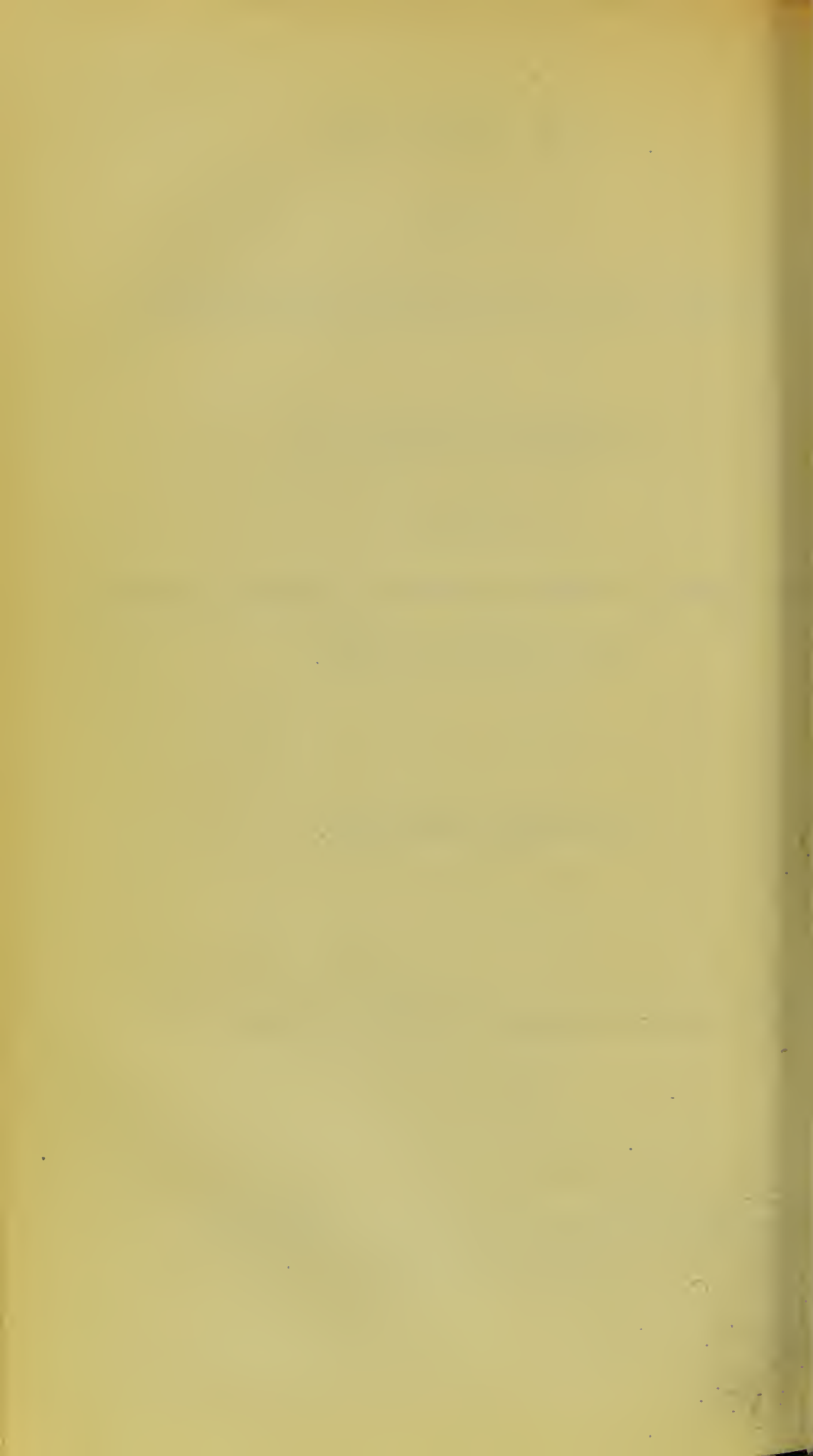
WAS AWARDED IN 1832.

BY JAMES MARR, M.D.

OPINIONUM COMMENTA DELET DIES NATURÆ JUDICIA CONFIRMAT.—CICERO.

THE EDINBURGH PRINTING COMPANY,

12, SOUTH ST DAVID STREET.



ON THE
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SECTION I.

OF THE PLANTS WHICH FURNISH STRYCHNIA.

STRYCHNIA, a peculiar vegetable alkali, was discovered by Pelletier and Caventou in 1818. The plants which furnish this substance form a genus called *Strychnos*, belonging in the Linnæan arrangement to the Class *Pentandria*, Order *Monogynia*, in natural arrangements to the *Luridæ*, (Linnæus,) the *Apocynæ*, (Jussieu.) Several species of the *Strychnos* have been examined, viz., *Strychnos Nux Vomica*, *S. Sancti Ignatii*, *S. Colubrina*, *S. Tieute*, *S. Potatorum*, and *S. Pseudokina*, all of which, with the exception of the two last, contain the substance in question.

SECTION II.

BOTANICAL, PHYSIOLOGICAL, AND THERAPEUTIC HISTORY OF
NUX VOMICA.

A short account of the first, *S. Nux Vomica*, only will be required in this paper. It is a native of Cochin-China, and

is called Cay-cu-ehi, also of Persia, (*Flora Cochín-China*, vol. i. p. 125.) It is found in many parts of the East Indies, in Ceylon, Malabar, and on the Coromandel Coast, (*Moon's Catalogue of Ceylon Plants*, p. 16.) "It is of a middling size, with a rather crooked, but thickish trunk and irregular branches; the leaves are opposite, on short petioles, ovate, shining, smooth on both sides, entire, three—five nerved, about four inches long, and from an inch to three inches broad; the flowers are small greenish-white, and collected in small terminating umbels," (*Ainslie's Mater. Med. Indica*, vol. i. p. 319,) having rather a disagreeable smell; the calyx is five—eleft and deciduous, the corolla monopetalous, and also five—eleft. The fruit is about the size of a small apple, covered with a smooth, somewhat hard shell, of a beautiful orange colour when ripe, and is filled with a soft, jelly-like, bitter, poisonous pulp, (*Op. cit.* vol. i. p. 318.) In this pulp are generally found seeds varying in number from three to five; these constitute the nux vomica of the Pharmacopœias; they are flat and round, about three-fourths of an inch in diameter, and covered with silky hairs; they are of an intensely bitter taste, and an odour like powdered liquorice, (*Christison on Poisons, first edition*, p. 638.) One of the seeds may weigh about 20 grains. In India, the seeds having been finely powdered, and intimately mixed with Margosa oil, are given in very minute doses for various diseases, (*Ainslie, Op. cit.* vol. i. p. 318.) They are also considered, in many parts of India, as a certain antidote to the bites of venomous serpents. Dr Fleming says that the natives of Upper Hindostan are in the habit of adding the seeds in the process of making arrack, in order to render the spirit more intoxicating.

From a statement in the *Lancet*, according to parliamentary returns, there appears to be imported into this country no less than 30,000 pounds of nux vomica, on an average, annually, (*Lancet*, 1829-30, p. 478.) If this statement be true, it certainly becomes a very important question in what manner all this substance is consumed.

Nux vomica produces very powerful effects on the animal

economy; even in very small doses it has proved fatal. Hoffmann mentions a case where two fifteen grain doses of the powder produced death; and, in Hufeland's Journal, there is a case where two drachms were attended with the same result in two hours, (*Christison Op. cit.*, p. 538.) For this reason practitioners have always been careful in administering it as a remedy; indeed, it was almost entirely laid aside till modern physiologists called the attention of the profession to the marked effects produced by administering it to the lower animals. These vary in different animals; according to Magendie and Delille, half a drachm of the powder killed a dog in forty minutes, and one and a half grain of the alcoholic extract, thrust into a wound, killed another in seven minutes; whereas Loss states that hogs may eat a large quantity with impunity; and Despartes gave very large doses to a goat* without producing any visible effect, (*Ainslie, Mat. Med. Ind.*, p. 320.)

Its deleterious property is manifested more quickly when injected into a vein, or a serous cavity, as the pleura or peritoneum, than when applied to any of the mucous surfaces of the body.

The following is the conclusion which Magendie came to, concerning the action of this substance on the living frame, viz., that it exerts an especial action on the spinal marrow, and nerves emanating therefrom, as well as on the muscles which these nerves supply.

Soon after this fact was made known, Fouquier was induced to try the nux vomica in paralytic affections, and published several cases where the exhibition of this remedy was attended with complete success. Magendie also published evidences of its efficacy in such cases.

Bayle has collected a numerous set of cases from different authors where nux vomica was used, with much success, in epilepsy, dysentery, &c.

* Goats seem to possess a very peculiar idiosyncrasy with regard to the action of poisons. I have seen a goat repeatedly swallow from half an ounce to an ounce of snuff without any apparent injury.

Still, however, from the violent nature of the substance, and the variation of its effects according to peculiarities in the preparation, &c., the great majority of the profession laid it aside as a dangerous and equivocal remedy.

SECTION III.

CHEMICAL HISTORY OF STRYCHNIA.

In 1818, as was already stated, Pelletier and Caventou discovered that the active properties of the genus *Strychnos* depended on the presence of a vegetable alkali, to which they gave the name of strychnia.

Dr Turner, in his *Elements of Chemistry*, recommends the following process of M. Corioll, as the best for preparing it: "A quantity of nux vomica is to be treated with successive portions of cold water, evaporating the solution to the consistence of a syrup, and precipitating the gum which is present by alcohol. The alcoholic solution is then evaporated to the consistence of an extract by the heat of a water bath. The extract, which consists almost entirely of the igosurate of strychnia, is dissolved by cold water, and, by this means, deprived of a little fatty matter which had originally been dissolved, probably through the medium of the gum. The solution is next heated, and the strychnia precipitated by a slight excess of lime-water, and then dissolved by boiling alcohol. On evaporating the spirit, the alkali is obtained pure, except in containing a little brucea,* and colouring matter, both of which are effectually removed by maceration in dilute alcohol. (*Turner's Chemistry*, p. 651; *Journal de Pharm.* Oct. 1825, p. 492.)

Strychnia, when pure, crystallizes in the form of octohedrons. It has a most intensely bitter taste, which is perceptible, it is

* Brucea is another vegetable alkali found in the *Strychnos*; it resembles strychnia very closely, only it is about twelve times less energetic.

said, when a grain is dissolved in 80 lbs. of water. (*Ann. de Chim. et de Physiq.* vol. x. p. 153.) It is very sparingly soluble in water, but easily soluble in alcohol and in the volatile oils. Its alcoholic solution has an alkaline reaction. It forms neutral salts with acids. Pure strychnia is not turned red by the reaction of nitric acid. (*Pelletier, Caventou, Ann. de Chim. et de Physiq.* xxxi. p. 56.) According to the analysis of Pelletier and Caventou, strychnia is composed of 78·22 of carbon, 6·38 of oxygen, 6·54 of hydrogen, and 8·92 of nitrogen.

SECTION IV.

PHYSIOLOGICAL ACTION.

Strychnia appears to possess the active properties of the nux vomica in a very concentrated state ; with the exception of hydrocyanic acid, there is no poison endowed with such destructive energy. Dr Christison has killed a dog in two minutes, by injecting one-sixth of a grain into the chest, in the form of alcoholic solution ; and he has seen a wild boar killed in the same manner with the third of a grain in ten minutes. The symptoms produced are very striking and uniform. "The animal trembles, and is then seized with a stiffness and starting of the limbs. These symptoms increase, till at length it is seized with a fit of violent general spasm, in which the head is bent back, the spine stiffened, the limbs extended and rigid, and the respiration checked by fixing the chest. The fit is then succeeded by an interval of calm, during which, the senses are quite entire. But another paroxysm soon sets in, and then another and another, till at length a fit takes place more violent than any before, and the animal perishes suffocated," (*Christison Op. cit.* p. 637.) The accuracy of this description I had an opportunity of verifying on many animals which were destroyed by this substance. The first

symptoms appear in sixty or ninety seconds when the poison is applied to a wound. When it is injected into the pleura, Pelletier and Caventou have seen them begin in fifteen seconds. M. Bouillaud has recently found that strychnia has no effect when applied directly to the nerves, (*Christison, Op. cit.*) When we touch an animal labouring under the effects of strychnia, a sudden start like that produced by an electric shock pervades its whole system. I saw this well marked in some of the cholera patients who were treated by strychnia at the Drummond Street Hospital. I may mention, that I have observed exactly the same starting in a child of two years old, who was labouring under the effects of a very extensive scald by boiling water.

The morbid appearances observed in animals poisoned by strychnia vary according to the period at which death takes place. Dr A. T. Thomson, in a paper read to the College of Physicians, London, gives an excellent account of these appearances. I shall relate his two cases at length, (*Lond. Med. Gaz.* vol. viii. p. 50.)

“I. A quarter of a grain of strychnia was placed on the tongue of a small spaniel. The animal was not much affected for ten minutes; when the dose was repeated, the usual symptoms attendant on poisoning by strychnia now manifested themselves, and the animal expired in ten minutes after the exhibition of the last dose of the drug. In ten minutes afterwards, the body was examined, and presented the following appearances: No indication was perceptible of any change having taken place in the circulation of the encephalon or spinal cord: the brachial artery of the left side was opened, and discharged dark blood: the lungs readily collapsed; they were not gorged with blood, but had minute petechial spots beneath the pleura. The heart was much distended, and could not be excited by pinching it. The distension was chiefly in the ventricles: the blood on the left side was not florid; the aorta was very much contracted. No apparent effect was produced, when the phrenic nerve was ir-

ritated longitudinally, but contractions were excited in a few fibres of the diaphragm, when the knife was drawn across it. The stomach was empty and contracted: the mucous surface throughout was pink, and without injection of vessels. The lining membrane of the other parts of the alimentary canal was white. The vessels of the outer covering of the kidneys were turgid with blood. The urinary bladder was empty and contracted: the gall-bladder was full and tense."

"II. Two grains of strychnia were given to a strong poodle; death took place as in the former case, just twenty minutes after the poison had been taken. The body was opened in four minutes after death; the lungs collapsed readily, were of the natural colour, and did not exhibit the petechial effusion under the pleura noticed in the former case. The heart was enormously distended, and could not be excited by any stimulus; the aorta was very much contracted, not exceeding a crow quill in size: the phrenic nerve had not lost its excitability; being rubbed transversely, short and rapidly repeated contractions of the diaphragm took place: and the effect was still stronger, when the nerve was rubbed longitudinally. In the abdomen, all the veins were unusually loaded with blood, while the arteries were correspondingly diminished. No change was observed in the circulation of the head or spine."

These experiments I repeated both on dogs and rabbits. The morbid appearances I found to vary considerably. In one set of cases, where death was produced almost instantaneously, by injecting a large dose of the poison into the cavity of the peritoneum or pleura, few or no morbid alterations could be detected. While in another set of cases, where death was slower, but took place within a few minutes after the exhibition of the strychnia, very marked general congestion was observed, the venous system in many instances appearing as if distended by artificial injection, while the arterial system was correspondingly emptied, and even appeared contracted on itself. The lungs commonly were slightly congested, but collapsed readily

enough. The heart was always found loaded with blood, particularly on the right side. The appearances of the mucous membrane of the alimentary canal varied considerably, even when animals had been destroyed by as nearly as possible the same quantity of the poison ; sometimes it seemed natural, at other times bore marks of great congestion, particularly that portion lining the stomach and upper portion of the small intestines. The stomach and urinary bladder generally were found contracted, particularly the latter organ, and of course never contained any urine. The brain and spinal cord presented an equal variety of appearance, varying from slight congestion to effusion of serum ; the latter, however, was only observed in two cases where death had been unusually slow. In none of these dissections could I observe, as has been alleged, that strychnia exerts any particular action over the cerebellum, nor did I observe that loss of irritability of the heart which Segalas and others say generally takes place ; on the contrary, it appeared that the organ retained its irritability just as long as in other cases where sudden death had been produced, and was equally capable of being roused by artificial respiration.

From these and many other similar experiments, it would appear that no particular morbid change except venous congestion is to be found in animals destroyed by strychnia, and that death in these cases usually takes place by asphyxia, produced by the prolonged universal spasm of the respiratory muscles. In other cases, however, where the animal is destroyed instantaneously, death takes place, by what W. Philip calls nervous apoplexy, by which I understand idiopathic apoplexy, or, as some explain it, the capillaries of the encephalon and medulla oblongata are so constricted that their function is completely suspended, and life consequently instantly becomes extinct, the same as from shocks of lightning, &c.

These experiments also show that there is a very close resemblance between the action of strychnia and nux vomica, the former, in fact, having all the properties of the latter, but only in a more concentrated form.

Accordingly, therefore, we have no hesitation in coming to

the same conclusion concerning strychnia as Magendie did regarding the nux vomica, that it exerts a special action on the medulla oblongata, spinal marrow, and nerves emanating therefrom, as well as the muscles which these nerves supply ; but it seems to have little direct influence over the brain.

In the human subject, the physiological action of this drug is the same as on the lower animals. In small doses it produces slight twitchings of the limbs, starting, particularly during sleep, increase of perspiration, frequent inclination to void urine, and acceleration of the pulse. In larger doses the twitchings amount to convulsive startings, and in some cases regular tetanic spasms have agitated the whole frame, much to the terror, both of the patient and the bystanders.

According to Fouquier, constipation follows the use of strychnia, while Professor Christison, I think, states that it more usually causes diarrhoea. For my own part, I agree with the former.

SECTION V.

CURATIVE PROPERTIES OF STRYCHNIA.

The investigation of the powers of a medicine, as a remedial agent, is, perhaps, one of the most perplexing of all medical enquiries. In none do we meet more difficulty in “tracing *effects* to their true *causes*, or in ascribing to *causes* their true effects ;” and, consequently, in none do we find vague hypotheses so much to abound.

But, more than this, we too often find individuals giving as the result of observation not what *really* takes place, but what, from preconceived notions, they think ought to take place.

Scarcely a new remedy has ever appeared, but some medical men have come forward and ascribed almost miraculous powers to it, while others, justly disappointed by the exaggerated views which have been put forward, go to the opposite extreme, and deny any virtues to the remedy at all. Strych-

nia is much in this state at present, one set of authors contending, that almost every variety of palsy, and many other diseases, may be cured by it; while others maintain, that it is not only totally inefficacious, but highly dangerous.

In considering this subject, I shall endeavour to divest myself, as much as possible, of all prejudice, and as far as my limited means will permit, to state fairly the actual properties, whatever they may be, of this remedy, and from them carefully to deduce what are its claims to be ranked among our remedial agents.

The diseases in which strychnia has been chiefly employed are Amenorrhœa, Chronic Diarrhœa, Cholera, Amaurosis, and Palsy. A consideration of its efficacy in each of these diseases we shall now give, in the order in which they have been enumerated.

I. *Amenorrhœa*.—We are indebted to Dr Bardsley for introducing strychnia as a remedy in this disease. He has collected twelve cases, ten of which were cured, and two were relieved by it. The cases were *amenorrhœa suppressionis*.

Six cases have occurred to me where this remedy was employed. In two, after using it for about a fortnight, the catamenia returned. In three others, although persevered in for some time, no benefit was derived; and, in the remaining one, twitchings took place, which so frightened the patient, that she could not be persuaded to go on with the drug. The action of the strychnia, in these cases, Dr Bardsley considers to be by stimulating the uterine vessels, and improving the tone of the general system.

The dose varied from the $\frac{1}{6}$ th to $\frac{1}{4}$ th of a grain three times a-day.

For my own part, I am not very sanguine as to the efficacy of strychnia in amenorrhœa, though, I believe, in some forms of the disease, particularly those where tonics or electricity are indicated, it may be given with advantage. But I should scarcely recommend its use until the more ordinary and simple means had been tried and had failed.

II. *Chronic Diarrhœa*.—Dr Bardsley, in his Hospital Facts, details six cases which were treated successfully by *strychnia alone*. Dr Balfour, in an elaborate and highly talented inaugural dissertation on Strychnia, relates three cases where a similar result was observed.

The following cases have come under my own notice at the Royal Public Dispensary here :—

1. Thomas Johnston, a porter, æt. 54, emaciated and of bad constitution, became a patient under Dr Monerieff, September 4, 1831. Has suffered from diarrhœa occasionally, sometimes very severely, for several years; ascribes the origin of his complaint to a residence while a soldier in the East Indies. Catechu, kino, the acetate of lead, and the usual remedies, were ordered with some benefit. On the 12th, he returned, stating himself to be as bad as ever. The sixth of a grain of strychnia, in the form of pill, was then ordered, three times a day; it was then gradually increased to the fourth of a grain, after which a marked improvement took place. At the end of three weeks he was quite well, and declared himself better than he had been for many months before.

2. — Lightbody, 10th May 1832, æt. 32, residing in Mary King's Close, has all the marks of confirmed phthisis. Has been treated in the usual way by leeches, counter-irritation, &c. A short time ago, bowel complaint came on, for which acetate of lead and opium, chalk, catechu mixture, &c. were ordered, with great relief, but ultimately they all lost their effect. From the state of the tongue, stools, &c., it was suspected that ulceration of the bowels had taken place. The strychnia was then exhibited in doses of $\frac{1}{8}$ th of a grain, three times a-day. This, with an occasional opiate at bedtime, gave great relief, *checking the diarrhœa*, and acting as a general tonic. He continued the alkali for some time, giving it up when the diarrhœa left him, and resuming it on the recurrence of the disease. This poor man, as was to be expected, gradually sank under the affection of the lungs.

3. Sarah Baxter, August 4, 1832, æt. 50, residing in Lawn-Market, has been suffering from bowel complaint for nearly

six months ; has taken various remedies with relief; but the disease has always returned. Formerly she had a severe attack, when she voided blood, but has not observed any during her present illness. She has usually five or six loose stools daily, almost always after eating, the stools are very offensive, liquid, and contain portions of undigested food. Particular attention was enjoined regarding diet, and strychnia to the extent of $\frac{1}{8}$ th of a grain, three times a-day, was ordered. In the course of a week the evacuations were lessened, and by the end of a month, without the use of any other remedy, she was entirely cured.

These cases have been selected from several others of a like character, where a cure has been effected, or relief obtained, from the administration of strychnia; but I think they are sufficient to warrant the conclusion, that, in chronic diarrhoea, strychnia is a useful and often a very serviceable medicine. Its use, however, ought to be limited to those cases which not unfrequently occur, and which baffle the usual treatment by sedatives, astringents, &c., and which seem to be owing rather to relaxation than irritation of the mucous membrane of the intestines. If any symptoms of inflammation of the membrane exist, the use of strychnia is decidedly contra-indicated. I believe the administration of strychnia, in the diarrhoea which accompanies phthisis, has never been tried before; but from what I saw in the case of Lightbody and four others where I used it, I am sure that it is a safe remedy, and one capable of affording considerable relief.

III. *Cholera*.—Of all the diseases to which the human frame is liable, perhaps there is none in which so many remedies have been tried, and so many have failed, as cholera; having, therefore, nothing on which we can place any reliance, we are, in my opinion, justified in giving a trial to any remedy which, from reason or analogy, we consider might be useful. Accordingly, strychnia has been given, 1st, from a supposed analogy betwixt cholera and diarrhoea; and, 2dly, from the property strychnia is known to possess, of powerfully stimulating the nervous system, which, or a portion of which, is

supposed by many to be very much depressed in this disease.

The following cases, which, through the kindness of Dr Mackintosh, I saw treated at the Drummond Street Hospital, may be regarded as giving a very fair and extensive view of the use of strychnia in this dire disorder:—

CASE I.—*October 17, 1832.*—Catherine Mackenzie, æt. 64, a widow, of general good health, but rather intemperate habits, was seized with diarrhœa two days ago, which has continued ever since. Vomiting came on this morning. Admitted at 9 P. M.

Universal coldness of surface. Pulse 92, weak, tongue dry and warm. Features rather contracted, expression anxious; has some pain of epigastrium.

Has had one characteristic stool since admission; says she voided urine at the same time. She complains also of great thirst, of giddiness, and pain of head.

To be placed on the steam-bed.

St. Strychniæ, gr. $\frac{1}{4}$ omni hora.

To have some whisky toddy occasionally.

18th, 10 A. M. The strychnia was stopped about four o'clock this morning, from nervous twitchings and startings having manifested themselves. Pulse 70, small and weak; skin warm, tongue dry; thirst continues severe; face flushed; has had numerous scanty characteristic motions during the night; no urine; great tenesmus; slight headache.

Omit Strychnia. Continue toddy.

2 P. M. Face flushed; pulse 90, of tolerable strength; has had neither purging nor vomiting for the last two hours; tongue dry and parched; complains much of thirst.

10 P. M. Pulse indistinct; has become quite comatose, and can scarcely be roused; breathing stertorous; a blister was applied to the nape of her neck; cold to the head; sinapisms to the legs; but the woman died on the morning of the 20th at four A. M.

CASE II.—*October 19, 1832.*—Johanna Sinelair, æt. 36, resides in Leith Wynd, health and habits reported good; was attacked three days ago with purging, which has continued ever since. Vomiting came on this afternoon about five o'clock. *Admitted 11 p.m.* Pulse small and weak; not countable; universal coldness of surface; tongue white and cold; countenance collapsed, eyes sunk, and surrounded with dark areola; lividity of lips and hands; fingers shrivelled; has had considerable characteristic vomiting since admission; says she is advanced six months in pregnancy.

Steam-bed—whisky toddy.

St. Pil. Strych. gr. $\frac{1}{4}$ omni hora.

20th, Ten A.M. Has taken seven of the strychnia pills, when, startings having come on, they were stopped. Pulse 120, of tolerable strength; skin warm, tongue moist, rather foul; thirst considerable; has had one scanty evacuation, but passed no urine since admission; appears to be very drowsy.

Abseind. capillæ; cold applications to be applied to her head.

The drowsiness, in this case, went on as usual to coma in spite of various remedies, and she died early on the morning of the 21st.

Sectio cadaveris.—Surface of brain highly injected; dark fluid blood in longitudinal and lateral sinuses. Heart, ecchymotic spots on surface; fibrinous clots in right auricle, ventricle, and pulmonary artery, and vena cava descendens; lungs much engorged; bronchi contained dark frothy mucus; kidneys contained a small quantity of puriform fluid in the pelvis of each.

CASE III.—*October 21st.*—Francis Muir, æt. 58, a hair-dresser. Wife died of cholera, son at present ill of it in Hospital. Previous health and habits reported good. Was seized with purging this afternoon about four o'clock. Has had no vomitings or cramps.

Admitted at six p.m. Pulse 67, full; tongue warm, moist, and whitish; slight thirst; surface natural; voice slightly affected;

has had several stools of characteristic appearance ; urine suppressed.

Habeat suppositor. ; ex Opii, gr. iv.

St. Strychniæ, gr. $\frac{1}{4}$, omni secunda hora.

Ginger beer for drink.

Oct. 22d. The pulse having become nearly imperceptible, and other symptoms of collapse having manifested themselves, eight lbs. of the saline fluid were injected into the basilic vein, which was attended with the usual good effect,* followed by a long continued rigor. Since last report, previous to injection, has had severe purging of characteristic appearance ; slight vomiting, with occasionally severe cramps of inferior extremities. Strychnia has been taken regularly.

Cont. Strychnia.—*Recp.* Suppositor.

10 A.M. Pulse 130, rather sharp ; tongue moist, but foul ; surface warm ; purging of characteristic appearance ; slight drowsiness, but is easily roused. Omit strychnia.

This man got gradually worse, and died at half-past eight on the morning of the 23d.

SECTIO CADAVERIS.

Brain.—Fluid blood in sinuses ; vascular externally ; a few ecchymotic spots on right hemisphere ; numerous bloody points on making sections ; slight effusion into lateral ventricles.

Lungs.—Extensive adhesion of left, great enlargement of both ; bronchi contained dark frothy mucus ; large fibrinous clot in right auricle and ventricle, extending into the pulmonary artery, even to its minute ramifications.

Liver mottled. Gall-bladder distended, with dark grumous bile.

Stomach.—Considerable vascularity near cardiac orifice ; mucous membrane thickened and softened ; mucous membrane of jejunum minutely injected in some places.

Colon.—Several ecchymotic spots on mucous coat. Urine in the bladder.

* By the usual good effect is meant, reaction taking place, the pulse becoming stronger, &c.

CASE IV.—*October 20th.*—John Muir, æt. 19, a hair-dresser from Catherine Street, son of the last patient. Health and habits reported good. Was seized this morning with purging about six o'clock, but has had no vomiting. Cramps came on at 10 A.M.

Admitted at 12 noon.—Pulse 120, of tolerable strength; tongue cold, white, and moist; heat of surface moderate; characteristic purging still continuing, with severe cramps; no vomiting; great thirst. Says that he has passed a good deal of urine to-day. App. sinap. erur.

St. Strychnia gr. $\frac{1}{4}$, quaque secunda hora.

Habeat suppositor, ex opii gr. iv.

8 P.M.—The pulse having increased in strength, and become sharp, with complaints of giddiness, he was bled to the extent of ten ounces, which reduced the pulse, and relieved the giddiness. At present his pulse is 120, and again sharpish; tongue white and moist; great thirst; very little urine voided; expresses himself much easier. Has taken his strychnia regularly. The whole quantity given is gr. i. ss.

Omit strychnia.

Ap. eucurbie. eruent. nuclæ et fluat sanguis ad $\frac{3}{4}$ vii.

Habeat suppos. ex opii gr. iv.

This man remained in a feverish state for a day or two, but made a rapid recovery.

Besides these, I have seen a vast number of cases of this disease treated by strychnia; but the foregoing cases throw just as much light on the effects of this remedy as the whole would do. As far as my observation goes, and I have alluded to those cases both impartially and attentively, I would say that strychnia, in the *majority* of the cases, even when administered in the doses I have mentioned, produces no appreciable effect; in short, that it is of no use in cholera.

I, however, consider it my duty to state, that I never saw a case of cholera, where the patient appeared to receive any injury by its use.

A most remarkable fact, observed in those cases, is the

quantity of strychnia which can be given without producing its usual effects on the system. In all the cases I have alluded to, it was given in combination with the muriate of morphia. I do not know exactly the proportion, but I am quite sure it was very small. Now Pelletier and Caventou recommend muriate of morphia as an antidote to strychnia, but, whether it is from the presence of this substance, or from the nature of the disease, that such doses of strychnia can be borne, I have not been able to determine.

IV. *Amaurosis*.—Dr Shortt, whose skill as a practical physician is well known, has the honour of being the first who used strychnia as a remedy for amaurosis. Since the publication of his Cases in 1830, it has been pretty extensively used; Dr Fife of Newcastle-upon-Tyne, Mr Middlemore of Birmingham, Mr Guthrie, and some others, have published cases confirming those given by Dr Shortt. I have also seen it used a good deal by Mr Liston.

In this paper I shall refer chiefly to Dr Shortt's cases, because, as a pupil of the Edinburgh Infirmary, I had the advantage of personally witnessing Dr Shortt's judicious treatment with this remedy.

Amaurosis being a term that is applied to various morbid conditions of the organ of vision, it becomes necessary to specify in particular those in which strychnia has been used, those in which it may be useful, and those in which its use is contra-indicated.

The cases in which it has been tried and found useful are those where the amaurosis depends on paralysis of the optic nerve and retina, or where it arises from congestion causing pressure on these parts, with a loaded and inactive state of the minute vessels of the neurilemmatic sheath. (*Dr Shortt, Ed. Med. and Surg. Jour.* vol. xxxiv. 416.) Dr Shortt believes the strychnia to act purely as a stimulant to the nervous matter of the nerves or their capillary system.

The cases in which the exhibition of strychnia is contra-indicated are those, where the amaurosis depends on any mor-

bid condition of the brain, any alteration in the osseous structure of the foramen opticum, on tumours, or any other substance pressing on the optic nerve, and on various structural derangements of the internal organ of vision, the result of previous inflammation.

There is no doubt that cases of amaurosis sometimes occur, where it is impossible by symptoms to discover the peculiar condition on which this state depends; but certainly it is our duty, before proceeding to use any remedy like the present, to endeavour to do so, by examining the eye, and carefully reviewing the history of the case.

In order to give as full an account as possible of the efficacy of strychnia in the treatment of amaurosis, I shall relate in full one of Dr Shortt's cases, and give the rest in a tabular view.

CASE I.*—"Peter Hamilton, æt. 22, an iron founder, admitted 16th June 1829, can only distinguish light from darkness. Both pupils are much dilated, the right more than the left. The iris in both is sensible to the stimulus of light. The eyes are clear, and, with the exception of a slight squint, present a natural appearance. This state of vision has continued for two years. His account of its commencement is as follows:

Having been for some years daily working under exposure to the heat and light of an iron founder's furnace, he became affected with flashes of light, when looking at minute objects, or when stooping. This indistinctness gradually became more and more obscure, for fifteen months. At the end of this time he could only distinguish light from darkness, and has remained in that state for nine months. His general health had all along been quite good.

17th. The temples were shaved and blistered, and one-eighth of a grain of strychnia dusted the following day on each side.

23d, (6th day.) Within the last week a blister has been

* Ed. Med. and Surg. Journ. vol. xxxiv. 417, *et seq.*

twice in succession applied to each temple, and to the raw surfaces, first one-eighth, then one-fourth, and to-day half a grain of the powder of strychnia. The pupils are less dilated, and the iris readily contractile; strabismus almost gone; tongue rather foul; bowels open.

25th. Can to-day distinguish colours pretty readily, and especially with the left eye, the iris of which is less sensible than that of the right. Half a grain was applied to each temple.

26th. Still continues to improve, and can distinguish yellow and red colours; some headache, and tongue much loaded and white. $\frac{3}{4}$ of a gr. to each surface: a cathartic mixture.

27th. Less headach; sight considerably improved, for he can distinguish print from writing. 1 gr. applied to each surface.

28th. Vision more distinct. Had an additional grain and quarter yesterday. Had $1\frac{1}{2}$ gr. on each surface.

July 2d, (15th day.) Had $1\frac{3}{4}$ gr. on the 30th. On the 1st, an attack of rigors, debility, sickness, vertigo, and headach, which are now gone, but feels weak. Can now clearly distinguish objects placed at the distance of some paces, and reads easily the hour upon a watch by evening twilight. Iris of both eyes quite sensible. Intermit strychnia.

4th. Sight still further improved. Renew the blisters, and $\frac{1}{4}$ gr. of the powder.

13th. Can now distinguish objects clearly at considerable distances. Pupils continue more contracted, although less than naturally. Strychnia from $\frac{1}{4}$ to $\frac{3}{4}$ of a gr. has been applied as before.

26th. Strychnia has not been applied since last report, from a sensation of violent heat over the skin.

August 4th. Since last report, 2 grs. have been applied to each temple, without any obvious effect; but improvement in vision continues.

16th. Has had 2 grs. on each temple for eight days. Repeat blisters, and apply $2\frac{1}{2}$ grs. to each surface.

September 8th, (79th day.) Since the last report, he has

been applying the strychnia from 2 to $3\frac{1}{2}$ grs. on each temple, without any constitutional effect, but with considerable improvement in his sight. There were some days of intermission when the blisters had to be renewed.

Yesterday he left the Infirmary, and attempted to write; but, finding that the act of stooping occasioned dimness in his sight, he returned the next day, and resumed the strychnia to the extent of gr. iij. on each temple, and continued gr. iiss. to the 13th. It was then omitted on the 31st. When he could see perfectly, he was ordered to apply the vapour of ammonia for a few days. The eyes appeared quite natural, the squinting gone, and he was able to tell the time upon the Tron Church clock from the Infirmary window,—at the distance of three hundred yards."

Name.	Age.	Date of Admission.	State of Eyes.	Duration of Complaint.	Cause.—Mode of Attack.	Previous Remedies Used.	Result of the Treatment by Strychnia.	Date of Dismission.
Andrew Drummond,	34	1829. October 2.	Can only distinguish light from darkness. Pupils contracted, and little sensibility in Iris.	Six years.	Gradual dimness, with loss during fever.	Blisters, Issues, Mercury, and various internal medicines.	Great improvement.—Can see to read the hour on a common watch.	1829. End of Nov.
George Millar,	52	1829. July 4.	Vision of both much impaired, but especially that of left.	Five months.	After a severe attack of Ophthalmia.	Blisters, Mercury, &c.	Considerable improvement.—Was able to distinguish objects at the distance of a quarter of a mile.	1829. September 6.
William Smith,	31	1829. October 13.	Pupils not dilated. Slight sensibility of Iris in both eyes. Extensive opacity of cornea in the left.	Twelve Years.	Gradually.	Blisters, &c.	Considerable improvement.	1829. November 10.
James Rankine,	—	1830. July 7.	Right eye unable to distinguish light from darkness. Pupil moderately dilated, and slightly sensible to light. Left, unable to read print of a very large size at a moderate distance.	Right eye two years. Left, 3 months.	Do.	Do. with Mercury, &c.	At first no effect; but, after the exhibition of Mercury, the Strychnia produced very considerable benefit.	1830. July 24.
John Watson,	40	1830. July 18.	The left eye amaurotic, but free from any morbid appearance. Also Paraplegia, with loss of power over the bladder and rectum.	Amaurosis for two years. Paraplegia for twenty days.	Do.		March 2.—Considerable improvement in vision.* July 19.—Considerable improvement in the Paraplegia also.	1830. August 11.
Walker Henderson,	43	1830. June 3.	Right eye completely amaurotic. Pupil moderately dilated, irregular and insensible to light. Left eye pupil contracted and irregular, but contracts sluggishly on the application of light.	Right, for two years. Left, for three months.	After Iritis.		Much relieved.	
Isabella Wailes,	30	1829. Nov. 21.	Both eyes completely amaurotic.	Four months.	From sudden suppression of menstruation.		In this case the Strychnia was given internally, and when Dr S. published his cases, there appears to have been no improvement.	1830. July 26.
Janet Barclay,	28	1830. June 18.	Amaurosis almost perfect, cannot see to read the largest print.	Right eye two years. Left eye 3 mo.	Gradually.	Blisters, &c.	Dismissed cured.	

It has been objected, that the good effects of strychnia remain only for a short time, and that it gives only temporary relief. Of all Dr Shortt's cases, none returned except Andrew Drummond, whose eyes continued in the same state as when he left the hospital till last summer, when he found them getting weaker. He then returned to Edinburgh for the express purpose of having the strychnia again applied, which was done under Dr Christison's directions, with the same good results as formerly.

It would be almost superfluous to relate more cases of amaurosis treated by strychnia, as I think the cases now related are sufficient to show, that, in one form of the disease, where it arises from an atonic state of the retina, or any other part of the nervous apparatus of the eye, strychnia is a remedy which may be safely tried, with considerable prospect of advantage, more especially if the cases be recent.

Strychnia has been recommended and used with success, by Mr Liston, in an analogous disease, viz. deafness, arising from an atonic state of the auditory nerve; but I regret that I have not been able to collect cases where it has been thus used.

V. Paralysis.—The first circumstance which led practitioners to think that strychnia might be useful in this affection, was, from observing, that, when paralytic limbs became affected with convulsions, they frequently regained their use; and so, consequently, by using any remedy which would excite these artificially, it was expected the same result might be obtained. How far experience has confirmed this view, we shall now take the opportunity of examining.

Dr Bardsley's experience of the use of strychnia in paralysis is particularly valuable, he having used it in no less than thirty-four cases. Nineteen were cases of paraplegia—of these, eleven were cured, one relieved, and in only one was no benefit obtained. Twenty-one were cases of hemiplegia—of these, eleven were entirely cured, six were much relieved, two somewhat relieved, and only in two was no amendment ob-

served; the remaining one left the hospital shortly after admission.

Dr Bardsley's cases are so interesting, so minutely and faithfully detailed, that, in order fully to illustrate that part of my subject, I shall take the liberty of transcribing a few of these cases, as published in his Hospital Reports.

CASE I.—“ Mary Mitchell, aged 30, admitted 28th March 1824. She has lost entirely the power of her left side, with diminished sensibility. Complains also of occasional severe headache, and is liable at times to sudden attacks of vertigo. Her articulation is much impaired. Urine and fæces passed involuntarily in bed. Corner of the mouth much drawn to her right side; pulse 86, rather feeble. Countenance pallid; sleeps ill. The attack occurred about three months ago, shortly after being delivered of twins, and has gradually increased. She attributes her complaint to overfatigue and cold when far advanced in pregnancy. Has used several remedies; but is ignorant of their nature. Ordered five leeches behind each ear, a blister to the nape of her neck, and a dose of common purging mixture of the house.

April 1st. Leeches bled freely, and blister discharged well, with relief to pain of head. Several copious stools obtained from purgative. To commence with the twelfth of a grain of strychnia, in the form of pill, twice a-day.

4th. Symptoms unchanged. Strychnia pill to be taken three times a-day.

7th. Head remains free from uneasiness. No perceptible effect from alkali.

10th. The dose of strychnia to be increased to the eighth part of a grain, three times a-day. Bowels regular.

14th. The alkali has not as yet occasioned any manifest effect upon the system. The fourth of a grain to be exhibited three times in the day.

20th. Has again complained of slight pain in the head, but without vertigo. She states that she experienced yesterday a slight sense of prickling in the paralytic members, which

continued for some time after each dose of the pills. No medicine required for bowels. Leeches to be repeated.

24th. Pain in the head very trifling since repetition of leeches. To continue.

27th. She appears to possess much more feeling in the affected side, as well as increased power over the paralysed muscles. Makes no complaint of pain of head this morning. Half a grain of strychnia to be taken twice in the day.

30th. On the second day after the exhibition of the alkali in this proportion, the patient experienced smart convulsive twitchings of the muscles of the diseased side. They are now present.

May 3d. She can move the paralytic limbs much better, and begins to feel conscious when the bladder and rectum are evacuated. To take one grain of strychnia twice a-day.

6th. Head became affected with stupor and vertigo, and rigid contractions of the muscles of both sides of the body supervened to her employment of the third dose of the alkali, in the proportion noticed in the report of the 3d. This quantity, however, was repeated yesterday and this morning, and has been unattended by the former severe effects of the medicine. The patient has regained a considerable degree of power over the leg and arm, and the tone of the sphincters of the bladder and rectum is much restored. Not deeming it prudent to increase the dose of the alkali, she was directed to continue the one grain twice in the day.

14th. This dose now occasions no inconvenience. To continue the strychnia in doses of half a grain, three times a-day.

17th. She is now much better; can hold a cup to her mouth when she wishes to drink, and also raise her left leg from the bed. She sits up during the day, and regularly asks for the bed-pan when she requires it. Speech more distinct. Pills to be continued.

20th. Continues to improve. To persevere with the pills.

28th. From the date of the last report up to the present period, her amendment has been rapid, for she now not only supports herself in the upright posture, with the aid of crutches, but even walks with them from one bed to another.

Her strength, articulation, and general health, are much improved. Appetite keen. She expressed a strong desire to leave the hospital, from a conviction that a change of air would effect her restoration to perfect health. She was accordingly discharged, greatly relieved, at the first meeting of the weekly board, with a request, on my part, she would inform me in case any relapse of her ailment should occur. Dr Bardsley heard from her in two months afterwards; she had recovered the perfect use of the paralytic members, and was able to attend to the affairs of her family, as well as at any former period of her life."

CASE II.—"John Princee, aged 29, spinner, was admitted an in-patient September 13, 1824. Was seized, about six months ago, with loss of power in the lower extremities, after bathing, whilst the body was much heated with exercise. He is now incapable of motion without the aid of crutches. He passes his urine and feces involuntarily; the spine is free from pain; his strength is much reduced; appetite bad; pulse 72, and rather feeble. I directed him to take pil. hydrargyri four grains every night, with a saline aperient on the following morning, for the first ten days.

On the 24th I commenced with the strychnia, in the dose of the sixth of a grain, three times daily.

October 4th. The alkali has not produced any effect upon him. Appetite somewhat improved. In other respects he remains in the same state as on his admission.

October 10th. Strychnia augmented to the fourth of a grain every fourth hour.

14th. Has experienced severe convulsive twitchings in the affected limbs. He is sensible of an increase of power in his inferior extremities, and wishes to rise, to make trial of his crutches.

22d. Is very much better. Strychnia to be taken in the proportion of half a grain three times daily.

November 4th. During this interval the alkali has been attended with great benefit. He is now capable of retaining

both his urine and fæces, and of walking from one end of the ward to the other with the aid of a small stiek. His appetite is good, bowels regular, and spirits cheerful. To continue the alkali.

November 16th. He is entirely cured. In order to show the pupils of the Hospital what he could do, he ran from one end of the long gallery to the other. To be discharged at the first meeting of the weekly board.

Dr B. had an opportunity of seeing his patient several times after he left the house, and found that he continued to enjoy the use of his lower limbs."

CASE III.—"Barnard Riley, æt. 43, admitted an in-patient November 4, 1824. He was seized suddenly with hemiplegia of the left side, without the occurrence of any premonitory symptoms. The power of voluntary motion in the affected side is quite gone, but its sensibility is not much impaired. His speech is almost unintelligible. His mind, however, continues clear. Strength reduced, appetite bad, bowels costive, and urine scanty; pulse 76, and of moderate strength. He complains of a dull pain in the forehead. I directed cupping at the nape of the neck, to the amount of fourteen ounces, and prescribed purgative medicine.

November 10th. Has derived great relief to pain in the head from cupping. He took more than a scruple of calomel, besides several ounces of the common senna mixture of the house, before the bowels were freely opened. The evacuations were dark, and highly offensive. A blister was applied to each temple, and a pill, with two grains of calomel and three of the compound extract of colocynt, was ordered to be taken each morning, and to be followed, in the course of three hours, by a purgative draught.

15th. Blisters rose well, and he now makes no complaint of forehead. The bowels have been freely unloaded. Having succeeded in removing the cerebral disturbance, and procuring a regular action of the intestinal canal, I deemed it safe to commence with the strychnia. He was, accordingly, di-

reected to take the sixth of a grain of the alkali every fifth hour. The purgative pills were discontinued.

22d. Little change in the symptoms. Dose of strychnia to be increased to the fourth of a grain every fourth hour.

29th. Says that the affected side has been very much twitched, and that he always experiences a prickling sensation in the hands and feet shortly after taking each pill. Thinks there must be something "*quick*" in them. His bowels are regular without medicine, and his appetite much improved. Pulse 82, and soft. To take half a grain of the alkali twice daily.

December 9th. Feels much better; indeed his improvement has been very evident during the last few days. He can raise both his arm and leg, and he articulates more distinctly.

20th. His recovery is rapid. He walked this morning from one end of the ward to another without either crutch or stick. His speech improves daily. To take half a grain of the alkali three times in the day.

28th. I consider him fit to be discharged. He walks well, and moves the left arm with as much freedom as the right.

January 10th. The strychnia was continued up to this period, when the cure was rendered complete."

CASE IV.—" Robert Hobson, æt. 38, finisher, admitted an in-patient October 6, 1827.

This is a case of paraplegia, the patient having lost the power over the inferior extremities, rectum and bladder. He states, that he first perceived, about four months ago, a weakness in his legs, rendering it necessary for him to use considerable effort to drag them along. This debility gradually increased, until at length he became altogether incapable of moving the lower limbs. He has no feeling in them. Head free from pain or giddiness. Pulse regular; appetite impaired. Being desirous of putting the *individual* efficacy of the strychnia to the test, I commenced with the exhibition of the alkali, in the proportion of a sixth of a grain twice

daily, without previously employing internal or local remedies of any kind.

October 10th. No change. Dose to be increased to the fourth of a grain three times a-day.

20th. He considers himself better, having obtained slight command over the sphincters of the bladder and rectum.

On the 14th he first experienced involuntary twitchings of the inferior extremities, which have been continued at intervals up to the present time. To take half a grain of the alkali twice daily.

28th. He is in excellent spirits, owing to the benefit he has derived from the use of the pills. He can raise the lower limbs to some height from the bed, and also retain at pleasure both his urine and fæces. During the last week, the twitchings have been rather severe, but not painfully so. He is very desirous of persevering with the pills. To continue.

November 7th. Since the last report, the patient has been allowed to sit up for several hours during the day. He is surprisingly improved, being able to walk, without the aid of a stick, from one end of the long ward to the other. Appetite good. Bowels regular. Warmth and sensibility of inferior extremities natural. Half grain pill to be taken three times daily.

26th. The additional half grain excited for some days powerful twitching in the legs and thighs; but, in the course of a week or less, they became not more severe than was occasioned by half a grain of the alkali taken twice in the day. He is now capable of walking as well as at any former period of his life, and his general health is excellent. It is impossible to describe the gratitude which this patient felt for his restoration to health. He was ordered to be discharged *cured*, at the first meeting of the weekly board."

CASE V.—"Margaret Royle, æt. 17, was admitted an in-patient on the 3d of April 1828.

This young woman had only menstruated twice, shortly

after her sixteenth year; and it appears from her mother's account, that she imprudently exposed herself to cold when the menses were last present, and since that period she has never been free from ailment. She first perceived a numbness in her lower extremities about eight months ago, which was followed by a gradual inability to move them. She has now neither power nor feeling in them, or in the bladder or rectum. No pain in the head. Appetite tolerably good. Pulse 74, of moderate strength. No apparent disease in the skin. I directed her to take, on the following morning, the eighth of a grain of strychnia, and to continue that dose twice daily. *No other internal or external remedies to be employed.* Has taken her medicine with regularity, but has not yet derived any benefit from it. Dose to be increased to the sixth of a grain at the same interval.

16th. Is somewhat improved, being able to move her toes occasionally. Says that her legs have been much twitched during the last week. To continue the medicine.

26th. The good effects of the remedy have been very evident since the last report. She can now retain both her fæces and urine, and walk from one bed to another, with the help of a small stick. Her power over the affected limbs increases daily. Fourth of a grain of the alkali to be taken three times in the day.

May 10th. She is now in perfect health, and walks as well as any patient in the hospital. To be discharged cured. Dr B. saw this patient some months afterwards, and had the satisfaction to learn that she had suffered no relapse of her malady.

Dr Balfour, in the essay already quoted, mentions six cases of different kinds of palsy, which, while acting as clerk in the Edinburgh Infirmary, he saw treated by Professor Dunean. Three were cured, and the remainder obtained various degrees of relief. Dr Dunean did not confine himself to strychnia alone, but varied it with the extract of nux vomica.

Dr A. T. Thomson, in the paper to which I formerly alluded, gives the details of two very interesting cases of hemi-

plegia, where strychnia was given with success; and several such are to be found scattered through the different British and Foreign periodicals. As far as my own observation goes, either from the cases which I have *seen* treated, or had under my own care, the results have been by no means so fortunate as in Dr Bardsley's practice. At the same time, I ought to state, that some very remarkable and unexpected cures have taken place from the use of this remedy.

One I shall mention, May 14, 1832, Agnes Morison, æt. 26, residing in High Street, has been confined to bed for nearly two years, from total loss of power in the lower limbs. Sensation was a good deal impaired, but not altogether lost; she is sensible if pinched or pricked. The fæces and urine frequently, but not generally, are passed involuntarily. She ascribes her complaint to an injury, or a supposed injury, which she received during the delivery of her second child. She has undergone a great deal of medical treatment, chiefly blisters and issues. Strychnia, in the form of pills, in the proportion of one-sixth of a grain, was ordered three times a-day; it was gradually increased to one-fourth of a grain, after which violent convulsive twitches of the limbs and the whole body took place. In sixteen days from the first commencement of the remedy, improvement in the power of the limbs was observed. This went gradually on, till, at the end of two months, she was able, with assistance, to be removed from bed; and, at the end of about three months more, she could walk about, and take some management of her house. She ultimately completely recovered. In this case, no remedy was used externally, and nothing but the strychnia and laxatives internally.

Of the use of strychnia externally applied over a blistered surface, I can speak very favourably. The first time I saw it thus used was in the practice of Mr Liston, in the Royal Infirmary. The case was one of partial paraplegia, arising from a fall; various remedies had been used previously, but without benefit. A blister was ordered to the lower part of the spine, and the surface was sprinkled with strychnia daily. In

the course of a few days, the usual twitchings and startings from the use of the drug made their appearance, and, within two months, the man was discharged perfectly cured.

Besides this, I have seen several other similar cases.

In local palsies, strychnia applied in this way will be found very useful, as may be seen from the following cases:—

CASE I.—*Paralysis of Fore-Arm.*— — — Forrest, æt. 53, July 14, 1832.

Nearly two months ago he suddenly lost the use of his right fore-arm and hand. The sensation is perfect; but he cannot extend his wrist or fingers. Shortly after the occurrence of the malady he applied to a surgeon, who blistered the parts twice; but that doing no good, he inserted a number of needles, which was attended with as little success.

As the case seemed a good one for testing the powers of the strychnia, I ordered a small blister to be applied to the back of the fore-arm, and $\frac{1}{4}$ th of a grain of the alkali to be applied daily. This was gradually increased to $1\frac{1}{2}$ grain, after which the usual constitutional effects manifested themselves with violent startings of the limbs. At the end of the second week, the arm obviously had more power, and an almost constant sensation of prickling along the fingers. Six weeks after the commencement of the treatment, he was dismissed cured, and able to resume his occupation as a joiner.

CASE II.—*Paralysis of Fore-Arm.*—Michael Fox, æt. 20, a labourer, of strong and robust habit, suddenly lost the power of his fore-arm, after sleeping on the grass during his dinner hour. The strychnia was used as above, and a complete cure effected in less than three weeks.

CASE III.—Retention of urine from paralysis of the muscular coat of the bladder.

James Moir, æt. 63, a silversmith, applied to me, in great misery, from inability to evacuate his urine. He stated, that, some time ago, he remained too long without voiding

urine, and drinking pretty freely at the same time. The consequence of which was, that he became unable to make any water at all, and it had to be withdrawn by an instrument. Since then he has occasionally suffered from retention of urine, and always is obliged to have recourse to surgical aid for relief. In the present instance he was at once relieved by the introduction of the catheter; but, from this time, he never could evacuate the bladder without artificial assistance. From the report of Dr Bally at La Pitié, I thought the strychnia might be of service.* A blister was ordered to be applied to the sacrum, and the raw surface to be sprinkled with the strychnia. At first, no obvious effect was produced, till one day, after very severe twitchings, which alarmed the patient much, the urine came away involuntarily. After which, the bladder seemed gradually to regain its tone, though I did not deem it prudent to give up the remedy, but continued it for some time in very minute quantities. This man I saw a short time ago, and he still continues well.

In paralysis of the face, from functional derangement of the portio dura, strychnia is often very useful. True it is, that often the disease is temporary, and will yield to very simple remedies, a mustard plaster, for example, but occasionally, in spite of all the usual remedies, the paralysis continues, leading the practitioner to fear, that there must be some organic change. In one case, which I saw last summer, the patient had been cupped, repeatedly blistered, &c. without benefit, yet it yielded, in a short time, to blistering, with strychnia applied as in the foregoing cases.

Mr Liston, as I have already mentioned, uses strychnia with much success externally. The same has been done by Dr Auchincloss at Glasgow, and by Dr Bally at La Pitié. The latter author, indeed, considers it more efficacious applied externally than given internally.

In cases of paralysis, arising from the introduction of lead

* Dr Bally exhibited the medicine internally; he relates three cases which were cured in this manner within a month.

into the system, Andral has found the administration of strychnia to be useful.—(*Mag. Journ. de Physiol.* t. iii. p. 266.)

M. Lerminier, at La Charité, gives his history of five cases of this kind, treated by this substance; in the first, a case of paralysis of the wrists, the alkali was gradually increased from eight-twelfths of a grain to two-thirds, twice a-day; after the latter dose, the patient soon complained of a painful sensation of cold in the extensors, which was speedily followed by a spasmodic contraction of these muscles. This case was completely cured within a fortnight. In the second case, which was similar to the last, the strychnia produced a tetanic affection of all the muscles, after which the patient rapidly recovered. In the third case, the paralysis was in no degree relieved, though the remedy was pushed to such an extent as to produce violent constitutional effects. In the fourth case, slight improvement took place. In the fifth, trismus took place to such an extent, that the patient became alarmed, and would go on no longer with the remedy.—(*Clinique Med. de M. Lerminier, pub. par M. Andral.*)

It is impossible to attend to the history of the cases which have just been related, without being convinced, that, in many cases of paralysis, strychnia may be used with the utmost advantage. But, in a disease like paralysis, varying in its symptoms, produced by such opposite causes, and depending on so many different pathological states of the system, the same remedy or method of treatment can never be applied to all.

It is obvious, that, in those cases of paralysis which arise from organic lesions of the brain or spinal cord, little benefit can be expected from any remedy or treatment whatever; to employ strychnia, in such cases, would only be to accelerate the fatal termination. But, on the other hand, in those cases where the paralysis seems to depend on functional derangement of the nervous system, or, as Dr Bardsley expresses it, “on diminished nervous energy,” under which head may be included cases arising from the introduction of lead into the system, from drunkenness, from exposure to cold, from concussion of the spinal cord, as in falls, from rheumatism, hy-

steria, &c., and also in various kinds of local paralysis, strychnia may be used with great advantage.

Dr Bardsley lays it down as a practical rule, always when there is any determination of blood to the head, or if the patient is of a plethoric habit, to have recourse to the ordinary antiphlogistic treatment, before resorting to the employment of strychnia.

It is necessary, however, to mention, that there is great room for deception in the treatment of paralysis. The disease frequently depends on temporary causes, as some slight effusion that will become absorbed without the aid of any medicine, or from slight congestion that will cease of its own accord, so that in such cases any remedy whatever that might be used at the time would get the credit of having accomplished a cure.

The fact, then, of the spontaneous cure of paralysis ought to make us cautious in drawing conclusions regarding the efficacy of any one particular remedy.

But I think the cases which have just been detailed are, in a great measure, free from this source of fallacy. They are of a sufficient number to show, that the result obtained was not accidental, as some might feel inclined to say, had a few solitary cases only been brought forward; and they had existed for such a length of time as to have given nature a sufficient opportunity to perform a cure, if she could do so unassisted. And, moreover, most of them had previously been subjected to the more ordinary methods of cure.

Duly weighing what has been now stated, I think we can hardly help coming to the conclusion, that strychnia is a very valuable remedy, and one from which much may be expected in the particular kinds of paralysis already specified.

Dose and mode of exhibition of Strychnia.—As this substance, from its large price, is very frequently adulterated, and often contains a portion of a kindred alkali, brucia, which is at least one-twelfth weaker than strychnia, it is unfortunately found, that its strength varies considerably. So

inefficacious is some of the strychnia purchased in the shops, that I have seen two grains given to a rabbit before it was sensibly affected by it.

From the variety of the strength, and the very powerful, and sometimes poisonous, effects of the remedy, on some constitutions, it behoves us to administer it with the greatest caution, beginning with the smallest doses one-eighth or one-twelfth of a grain, in the form of pill, with bread crumb twice or thrice a-day, carefully watching the effect on the system, and gradually increasing the dose till twitches of the muscles take place. After that the quantity need not be increased, but even may be lessened or suspended for a time. In those cases where very severe spasms are induced, the exhibition of thirty or forty drops of the solution of the muriate of morphia will relieve them. Externally it is best applied over a raw blistered surface; the quantity used varies from one-fourth grain to two grains daily, or even more, according to the constitutional effect produced.

I shall now bring this paper to a close, by briefly recapitulating the conclusions to be drawn from the facts already adduced.

1. The active principle of nux vomica is the vegetable alkali strychnia.

2. The physiological action of strychnia is the same as that of nux vomica, viz. on the spinal cord, medulla oblongata, and nerves emanating therefrom, as well as on the muscles which these nerves supply.

3. Consequently, strychnia may be used in those diseases in which the preparations of nux vomica are used; and, if we could only obtain it free from adulteration, with this advantage, that it is more certain in its operation, and less variable in its effects.

4. It may be safely used, and with advantage, in obstinate cases of amenorrhœa. But we are not justified in having recourse to it, till we have made trial of the ordinary and less powerful remedies.

5. That it is a valuable remedy in chronic diarrhœa, more especially in that form of it which appears to depend on relaxation, rather than irritation, of the intestinal canal, and which so frequently baffles the more general and usual modes of treatment.

6. Like most other remedies, it is of no use in cholera.*

7. It may be used, with considerable prospects of success, in certain forms of amaurosis, (already specified.)

8. It is an excellent remedy, one of the best we are yet acquainted with, in certain cases of paralysis, which do not depend on organic lesions, but on functional derangement of the nervous system; and many cases deemed hopeless under the ordinary modes of treatment may be cured by it.

* It is proper to mention here, that Dr Mackintosh comes to a very different conclusion, viz. that it is of more use than any other remedy in cholera; and he says still further, were the disease to reappear, he would again have recourse to this medicine, and in larger doses.